Turn-key Near-Infrared Photon-Counting Detector Module for LIDAR Applications, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

Based on the prototype photon counter developed during Phase I, we will deliver a next-generation photon counting detector optimized for LIDAR applications within the near-infrared spectral band. For maximum flexibility, the system will employ user-interchangeable plug-in detectors optimized for performance in specific spectral bands commonly used in LIDAR applications. One such detector will be optimized for the 0.9 to 1.7 micron band for use with 1.55 micron eye-safe lasers, and another will be optimized for the 0.9 to 1.1 micron band for use with neodymium lasers. By optimizing the bandgap of the InGaAsP APD for operation near 1 micron, we expect to obtain much higher QE than commercial silicon APDs simultaneously with dark count rates comparable to those of commercial silicon photon counters. The entire system will be packaged in a compact and rugged modular unit requiring only 110 VAC power and passive ambient air cooling. An entirely solid-state miniature refrigeration system based upon the system developed in Phase I will enable operation of the APD detectors at temperatures below 200 K without the need for cryogenic liquids or external liquid chillers. This miniaturization will be a significant step towards construction of near-infrared photon-counting systems suitable for spaceborne platforms.

Primary U.S. Work Locations and Key Partners

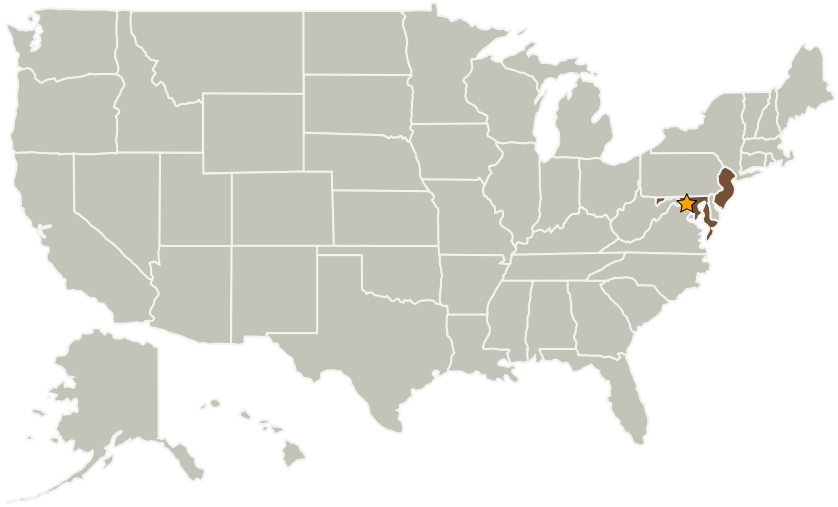

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Sensors Unlimited, Inc.	Supporting Organization	Industry	Princeton, New Jersey

Primary U.S. Work Locations	
Maryland	New Jersey

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers